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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,021	06/22/2005	Alain Vandergheynst	Q72658	8865

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EXAMINER	
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ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
01/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,021	VANDERGHEYNST ET AL.	
	Examiner	Art Unit	
	VADIM DUDNIKOV	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1-16,19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/4/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

`DETAILED ACTION

1. A new examiner has assumed responsibility for the examination of the application. This office action is in response to the applicants responses filed at November 8, 2007. Amendments filed 11/08/2007 and 5/4/2007 form the basis of this office action.

Election/Restrictions

2. Applicant's election without traverse of Species 3, Subspecies A, a), a1 and a2 is acknowledged. Amended claims 1-17 and 19-20 have read as elected by Applicant for further consideration.

Response to Amendments

3. Claims 1, 4, 6, 7, 9, 10, 12, 13, 15 and 16 have been amended. Claims 17 and 18 have been canceled. Claims 19 and 20 have been added.
Those rejections and objections that have been overcome by amendment are omitted from the present Office action and are considered withdrawn.

Response to Arguments

4. Applicant's arguments and remarks see pages 8-13, filed on 5/4/2007 and pages 8-9, filed on 8/20/2007with respect to of said previous Office actions have been fully considered but they are not persuasive because relating to amended claim language, rather to rejected claim language

Rejections of amended claims are established in light of further consideration and search of the prior Art. See rejections underneath.

Claims 1-16 and 19-20 presently pending has been examined.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not

commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-6, 8-15, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. (Design study of MOX fuel rod scanner for ATR fuel fabrication", LA-13324-MS, September 1997), (Griffith hereafter) in view of Shoenig et al., (US Patent No. 4,902,467), (Schoenig hereafter).

Regarding claim **1**, Griffith teaches: A method for carrying out a comprehensive quality control of a MOX fuel rod (Title, Abstract, Introduction) comprising the steps of: measuring a plutonium content of pellets contained in said rod (page 1, Phase II, lines 1+; page 2,Phase III, lines 1+), and checking for rogue pellets in said rod (page 2,Phase III, lines 1+; Fig. 35; page 40, lines 5+)), wherein: the fuel rod is axially moved (Fig. 9; page 15, lines 4+), said measurements and checks are performed along the fuel rod moved axially (Fig. 9; page 15, lines 4+), and radiometry is used for said control (page 44, lines 1+), the plutonium content being measured and said rod simultaneously checked for rogue pellets through scanning of the native gamma radiation emitted by the plutonium and americium contained in the pellets with at least one detector with several different energy window discriminators (Fig. 35, page 40 lines 5+).
Griffith does not necessary teach directly the limitation: "said measurements and checks are **concurrently** performed along the fuel rod moved axially".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Shoenig, drawn to non-destructive testing of nuclear fuel rods, hence analogous art, who teach an apparatus and method for concurrently control of different properties of nuclear fuel rods performed along the fuel rod moved axially (Abstract, Fig. 1column 5, lines 19+).

Schoenig discloses a system for non-destructively testing nuclear fuel rods comprising multiple detector devices for quality control of multiple rod attributes, and means for conveying the nuclear fuel rods at uniform speed. The detector devices comprise the following:

- An optical reader (14) for identifying rods by engraved serial numbers,
- An annular detector (30) for measuring the gamma ray emission resulting from the natural decay of elements in the fuel material,
- A multi-detector gamma densitometer (32) including a collimated gamma source (e.g., ^{137}Cs) and plastic scintillation detector,
- An active scanner (38) including a collimated neutron source (e.g., ^{252}Cf) and annular gamma ray detector.

These detector devices are each coupled to a computer (16) that performs the conventional analysis – i.e., energy discrimination and summing (col. 8, lines 2+) – in order to obtain information regarding the elemental constitution of the rods, as well as their internal structure or dimensions. The means for conveying the rods is embodied by multiple sets of pinch rollers (24) that read on the claimed synchronized driving

mechanisms. The devices listed above are aligned in the path of the moving rod and operate **concurrently**.

Motivation for said inclusion derives from Schoenig: "Since every fuel rod must be tested, manufacturing throughput is severely reduced by this passive scanning approach", (column 2, lines 16+).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Current claim 1 limitation is an obvious for ordinary skill in the art modification of a Griffith teaching as disclosed by Schoenig teaching.

On claim **2**, Griffith teaches: moving continuously said fuel rod at constant speed during said measurements and checks (Fig. 9; page 15, lines 4+).

On claim **3**, Griffith teaches: said energy window discriminators comprise discriminators with at least the following energy windows: below 100 KeV and above 500 KeV for detecting the native gamma radiation of 241Am; and
between 90 KeV and 500 KeV for detecting the native gamma radiation of Pu and its decay products (page 36, lines 1+; page 40, lines 4+; page 42, lines 1+).

On claim **4**, Griffith teaches: simultaneously measuring the plutonium content and detecting rogue pellets through scanning of the gamma radiation emitted by the plutonium contained in the pellets after activation by thermalized neutrons from a source of thermalized neutrons, the measuring being performed with at least one detector (page 30, lines 1+). And Schoenig teaches: "To dramatically reduce the testing time for

fuel rods "active scanning" approach has been adopted", (column 2, lines 19+; column 7, lines 37+)

On claim **5**, Schoenig teaches: simultaneously detecting said gamma radiation with the plurality of detectors, the signals of which being discriminated with several energy windows, temporally shifting the said delivered signals, and summing the shifted signals, (column 7, lines 37+).

Motivation for said inclusion derives from Schoenig: "To dramatically reduce the testing time for fuel rods "active scanning" approach has been adopted", (column 2, lines 19+).

On claim **6**, Schoenig teaches: simultaneously checking the internal structure through subjecting the rod to an external gamma source, and scanning the traversing gamma radiation with a gamma detector (gamma densitometer 32 in Fig. 1, column 7, lines 30+)

Motivation for said inclusion derives from Schoenig: "Since every fuel rod must be tested, manufacturing throughput is severely reduced by this passive scanning approach", (column 2, lines 16+).

On claim **8**, Schoenig teaches: simultaneously checking conformity of a rod identity with the plutonium content through electro optical reading or image processing of identification code(s), (optical reader 14 in Fig. 1, column 5, lines 47+).

Motivation for said inclusion derives from Schoenig: "Since every fuel rod must be

tested, manufacturing throughput is severely reduced by this passive scanning approach", (column 2, lines 16+).

On claim **9**, Schoenig teaches: moving the fuel rod is carried out by using two independent but strictly synchronized driving mechanisms, one located at a feed end and one at an exit end of a rod scanning apparatus comprising said at least one detector so as to ensure a constant progression of the fuel rod through the apparatus from one end plug of the fuel rod to another, said two mechanisms being spaced at a distance shorter than the length of the rod, (two rollers 24 at a closely regulated, uniform speed shown in Fig. 1; column 6, lines 1+).

Regarding claim **10**, Griffith teaches: An apparatus for comprehensive MOX fuel rod quality control comprising:, a radiometry system having at least one detector with several different energy window discriminators for measuring the plutonium content and detecting rogue pellets by scanning the native gamma radiation emitted by the plutonium and americium contained in the pellets, (Fig. 35, page 40 lines 5+). Griffith does not necessary teach directly the limitation: "means for moving the fuel rod axially at constant speed, comprising at least two independent but strictly synchronized driving mechanisms, one located at a feed end and one at an exit end of the rod control apparatus, a series of measuring and checking systems aligned along the path of travel of said fuel rod and operating concurrently".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Shoenig, drawn to non-destructive testing of nuclear fuel rods, hence analogous art, who teach an apparatus and method for concurrently control of different properties of nuclear fuel rods performed along the fuel rod moved axially (Abstract, Fig. 1column 5, lines 19+) and means ((two rollers 24 at a closely regulated, uniform speed shown in Fig. 1; column 6, lines 1+) for moving the fuel rod axially at constant speed, comprising at least two independent but strictly synchronized driving mechanisms (two rollers 24 at a closely regulated, uniform speed shown in Fig. 1; column 6, lines 1+), one located at a feed end and one at an exit end of the rod control apparatus, a series of measuring and checking systems aligned along the path of travel of said fuel rod and operating concurrently.

Schoenig discloses a system for non-destructively testing nuclear fuel rods comprising multiple detector devices for quality control of multiple rod attributes, and means for conveying the nuclear fuel rods at uniform speed. The detector devices comprise the following:

- An optical reader (14) for identifying rods by engraved serial numbers,
- An annular detector (30) for measuring the gamma ray emission resulting from the natural decay of elements in the fuel material,
- A multi-detector gamma densitometer (32) including a collimated gamma source (e.g., ^{137}Cs) and plastic scintillation detector,
- An active scanner (38) including a collimated neutron source (e.g., ^{252}Cf) and annular gamma ray detector.

These detector devices are each coupled to a computer (16) that performs the conventional analysis – i.e., energy discrimination and summing (col. 8, lines 2+) – in order to obtain information regarding the elemental constitution of the rods, as well as their internal structure or dimensions. The means for conveying the rods is embodied by multiple sets of pinch rollers (24) that read on the claimed synchronized driving mechanisms. The devices listed above are aligned in the path of the moving rod and operate **concurrently**.

Motivation for said inclusion derives from Schoenig: "Since every fuel rod must be tested, manufacturing throughput is severely reduced by this passive scanning approach", (column 2, lines 16+).

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Current claim 1 limitation is an obvious for ordinary skill in the art modification of a Griffith teaching as disclosed by Schoenig teaching.

On claim **11**, Griffith teaches: said energy window discriminators comprise at least one energy window discriminator for each of the following energy windows:
below 100 KeV and above 500 KeV for detecting the native gamma radiation of 241Am; and between 90 KeV and 500 KeV for detecting the native gamma radiation of Pu and its decay products (page 36, lines 1+; page 40, lines 4+; page 42, lines 1+).

On claim **12**, Griffith teaches: for measuring the plutonium content and detecting rogue pellets, said apparatus further comprises : a source of thermalized neutrons for activation of the plutonium, and at least one detector for the scanning of the gamma

radiation emitted by the activated plutonium contained in the pellets (Fig. 8, page 13, lines 11+, VIII, rod scanning system model).

On claim **13**, Griffith teaches: at least one annular detector for measuring the plutonium content and detecting rogue pellets, (Fig. 30, Fig. 31, page 38, lines 1+).

On claim **14**, Schoenig teaches: means (computer 16 in Fig. 1; main program in Fig. 2) for summing temporally shifted γ-counts, (column 7, lines 37+).

Motivation for said inclusion derives from Schoenig: "To dramatically reduce the testing time for fuel rods "active scanning" approach has been adopted", (column 2, lines 19+).

On claim **15**, Griffith teaches: for checking the internal structure and constituents of the rod, said apparatus further comprises : an external source of gamma radiation, and a single gamma detector for scanning the gamma radiation traversing the fuel rod (page 43; XV. Active gamma-ray densitometer).

On claim **19**, Griffith teaches: said energy window discriminators also comprise discriminators with at least one of the following energy windows: between 150 KeV and 350 KeV (page 36, lines 5+; VIII. Design goals, lines 4+) for detecting the native gamma radiation of 237U resulting from the radioactive decay of 241Pu; and/or between 350

KeV and 500 KeV for detecting the native gamma radiation of 239Pu, (page 36, VIII. Design goals, lines 4+).

On claim **20**, Griffith teaches: said energy window discriminators also comprise discriminators with at least one of the following energy windows:
between 150 KeV and 350 KeV (page 36, lines 5+; VIII. Design goals, lines 4+) for detecting the native gamma radiation of 237U resulting from the radioactive decay of 241Pu; and/or between 350 KeV and 500 KeV for detecting the native gamma radiation of 239Pu, (page 36, VIII. Design goals, lines 4+).

8. Claims **7** and **16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffith et al. (Design study of MOX fuel rod scanner for ATR fuel fabrication", LA-13324-MS, September 1997), (Griffith hereafter) in view of Shoenig et al., (US Patent No. 4,902,467), (Schoenig hereafter) and further in view of Applicant's admissions Prior Art (APA) and Chen et al. (US 6,297,507 B1), (Chen hereafter).

As stated in the Background of the Invention section of the instant specification, "[contamination of the external surface of the fuel rod] is commonly verified by measuring the alpha activity of the fuel rod or selected areas of the fuel rod" (p. 2). See MPEP § 2129. It would have been obvious to one of ordinary skill in the art to modify the system taught by Griffeth and Schoenig to include a conventional alpha detector (Scintillating screen with a photocounter, known in art of particles registration more than 50 Years). The truncated disclosure of the annular scintillation

detector 41 of the instant application (specification, p. 12), which fails to set forth sufficient enabling guidance, is taken as an implicit disclosure that the claimed alpha detector configuration is conventional.

Chen discloses an annular alpha particle detector (see Abstract). Although this detector is not used in the same way as the detector claimed, Chen et al. provide further evidence that annular alpha particle detectors are widely available. It would have been obvious to one of ordinary skill at the time of invention to employ this widely available technology as claimed, as such is no more than the advantageous application of a well known expedient in the art. Just as the fuel rod is passed through a channel extending through the gamma detectors disclosed by Shoenig if the skilled artisan wished to verify the external contamination of the fuel rod – as is common, according to Applicant – the skilled artisan would pass the fuel rod through a channel extending through a conventional annular alpha particle detector.

The claims would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Current claim 1 limitation is an obvious for ordinary skill in the art modification of a Griffith and Shoenig teaching as disclosed by APA and Chen teaching.

Conclusion

9. Applicant's amendment filed at 3/30/2007 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patent Examiner.

Vadim Dudnikov

January 17, 2008.

Primary Examiner.

(AU3663)

Johannes Mondt (AU3663)